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GROUP THEORY.

7. Proposed by M. E. GRABER, A. M., Heidelberg University, Tiffin, Ohio.

Which linear substitution will transform $x_1x_2 + x_3x_4 + x_5x_6 = 0$ into $y_1^2 + y_2^2 + y_3^2 - y_4^2 - y_5y_6 = 0$?

Remark by the PROPOSER.

One substitution having the desired property is

$$\left\{ \begin{array}{cccccc} x_1, & x_2, & x_3, & x_4, & x_5, & x_6, \\ y_1 + iy_2, & y_1 - iy_2, & y_3 + y_4, & y_3 - y_4, & -y_5, & y_6, \end{array} \right\}^*$$

where $i = \sqrt{-1}$.

PROBLEMS FOR SOLUTION.

ALGEBRA.

237. Proposed by F. F. MATZ, Sc. D., Ph. D., Reading, Pa.

Solve $x^2 + y + z = 12 \dots (1)$; $x + y^2 + z = 8 \dots (2)$; $x + y + z^2 = 6 \dots (3)$.

238. Proposed by S. A. COREY, Hiteman, Iowa.

Prove that $\frac{1}{1+n} + \frac{1}{3(n+3)} + \frac{1}{5(n+5)} + \dots = \frac{1}{2} \left[\frac{1}{(n-1)} + \frac{1}{3(n-3)} + \frac{1}{5(n-5)} + \dots + \frac{1}{l(n-l)} \right]$, n being an even positive integer and $l = n - 1$.

239. Proposed by J. J. KEYES, Fogg High School, Nashville, Tenn.

Solve $\sqrt[4]{(41+x)} + \sqrt[4]{(41-x)} = 4$.

GEOMETRY.

260. Proposed by W. J. GREENSTREET, M. A., Editor of The Mathematical Gazette, Stroud, England.

Perpendiculars to the radius vector are drawn through points on $r = a + b \cos n\theta$. Find the radius of curvature of their envelope at a point at a given distance from the origin.

261. Proposed by R. D. CARMICHAEL, Hartselle, Alabama.

Given three non-intersecting circles; to draw eight tangent circles, each tangent to all three of the given circles.

*More generally, one set of substitutions fulfilling the required conditions, is

$$\left\{ \begin{array}{cccccc} x_1, & x_2, & x_3, & x_4, & x_5, & x_6, \\ ay_1 \pm aiy_2, & ay_1 \mp aiy_2, & ay_3 \pm ay_4, & ay_3 \mp ay_4, & \pm ay_5, & \mp ay_6, \end{array} \right\}$$

where a is not equal 0. ED. E.